



CLConfig Tool

User's Guide for Baumer CLConfigTool



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1. General Information

The CL Config Tool, part of the generic application programming interface from Baumer, is the perfect evaluation tool for Baumer cameras with Camera Link® interface. It allows to investigate the extensive functionality within our innovative cameras.



Read these manual carefully and observe the notes and safety instructions!

Keep the User's guide store in a safe place and transmit them to the eventually following users.

Target group for this User's Guide

This User's Guide is aimed at experienced business users, which want to integrate camera(s) into a vision system.

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Classification of the safety instructions

In the User's Guide, the safety instructions are classified as follows:

Notice

Gives helpful notes on operation or other general recommendations.

1.1 CameraLink®

The CameraLink® interface was especially developed for cameras in machine vision applications and provides high transfer rates and low latency. Depending on the configuration (Base, Medium or Full) the transfer rate adds up to 625 MBytes/sec.

- Base (max. 24 Bit per Clock)
- Medium (max. 48 Bit per Clock)
- Full (max. 64 Bit per Clock)

Cameras of the Baumer SXC series are equipped with a CameraLink® Base interface. Cameras of the Baumer HXC series are equipped with a CameraLink® Full interface.

1.2 General System Requirements

	Single-camera system		Multi-camera system	
	Minimum	Recommended	Minimum	Recommended
CPU	Intel® Pentium®4 or comparable processor	Intel® Core™ Duo comparable processor		
Clock	2.5 GHz	> 2.5 GHz	2.5 GHz	3 GHz
RAM	1024 MB	2048 MB	2048 MB	> 2048 MB
Operating system (OS)	Microsoft® Windows® XP incl. Service Pack 2 or higher Microsoft® Windows® XP x64 incl. Service Pack 2 or higher Microsoft® Windows Vista™ 32 / 64 bit systems Microsoft® Windows® Windows 7 32 / 64 bit systems			
Graphics	recommended resolution 1280 x 1024, color depth at least 16 bit			
Framework	Windows® OS: .NET™ Framework 2.0 or higher			

1.3 Installation

The CL Config Tool is part of the installation package Baumer-GAPI. The CL Config Tool can be start directly from CD and requires no installation.

Notice

The log file (trace), is written in the directory where the program is located. When you start the program from CD and you want to write a log file, you must change the path to write the log file.

Set the path under: System → Options → Trace

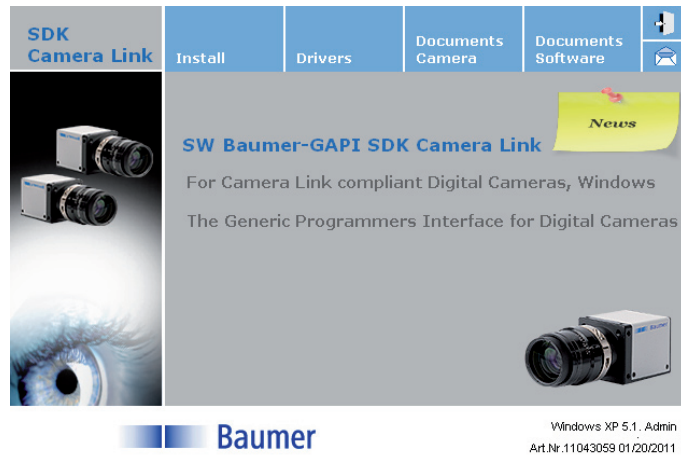
2. Baumer CL Config Tool

2.1 Overview

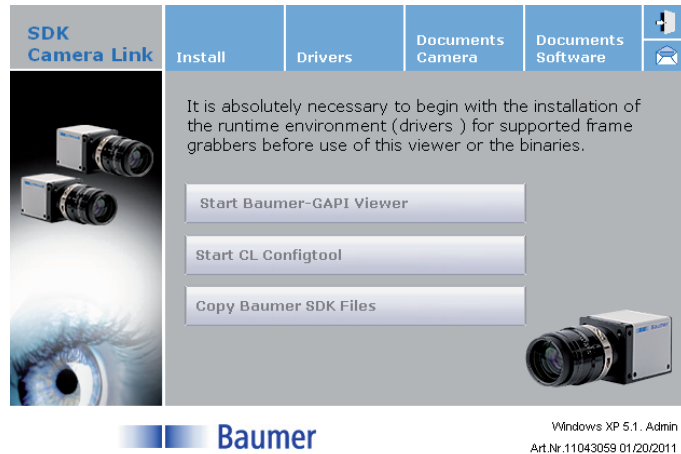
CL Config Tool is used to control cameras with CameraLink® interface. It does not grab and display images.

2.2 Program Start

Insert the CD. → The following window appears (if Autorun is enabled).



Click "Install" → The following window appears.



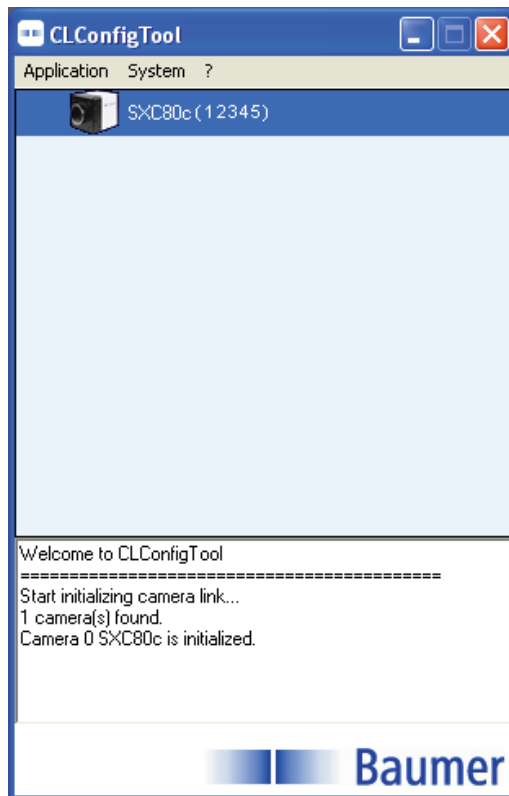
Click "Start CL Configtool" to start the program.

Notice

If CLConfig tool does not start, check that .NET™ Framework 2.0 or higher is installed on your system.

2.3 Main Window

Afterward the main window (Fig. 1) appear.



◀ **Figure 1**
Main window of the
Baumer CLConfigTool

Here you will find a menubar with two menus, which are described in more detailed within the next paragraphs.

Notice

When you first start you are prompted for the path to the Cameralink® serial DLL.

For Windows 7 you need Admin rights to copy the DLL. Start the Tool with a right-click at the CLConfigTool.exe-file and select "Run as administrator" (Windows 7 / 64 bit only).

Type the path where the file is (e.g. "*clsermtx.dll*"). This file is provided by the Frame grabber manufacturer.

This path is stored in the Windows registry under:

HKEY_LOCAL_MACHINE \ SOFTWARE \ CameraLink

After setting the path, select "System" → "Rescan".

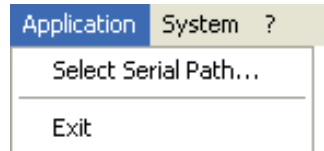
Notice

If you still do not see the camera, please check the cables.

2.3.1 Menu Application

Figure 2 ►

Menu Application



By selecting the menu item "Select Serial path..." you can specify the path to the serial DLL.

The path must be specified if by the start of the software no camera is found or you have installed a new frame grabber.

Notice

If the path already exists you will overwrite it with this process!

Notice

For Windows 7 you need Admin rights to copy the DLL. Start the Tool with a right-click at the CLConfigTool.exe-file and select "Run as administrator" (Windows 7 / 64 bit only).

This path is stored in the Windows registry under the following key:
HKEY_LOCAL_MACHINE \ SOFTWARE \ CameraLink

This file is provided by the Frame grabber manufacturer. Type the path where the file (e.g. "clsermtx.dll") is.

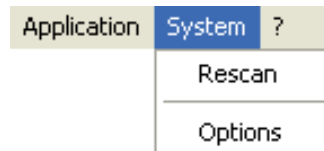
After setting the path, select "System" → "Rescan".

By selecting the menu item "Exit" the tool can be aborted.

2.3.2 Menu System

Figure 3 ►

Menu System



This menu contains two items: "Rescan" and "Options".

2.3.2.1 Rescan

Select "Rescan" after "Select Serial Path...", when you have connected a new camera.

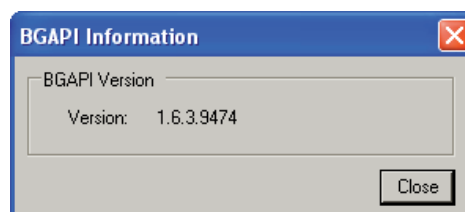
2.3.2.2 Options

Here several options regarding to the interface and the camera can be adjusted. Further information on the options window will be given in section 2.7.

2.3.3 Menu "?"

Figure 4 ►

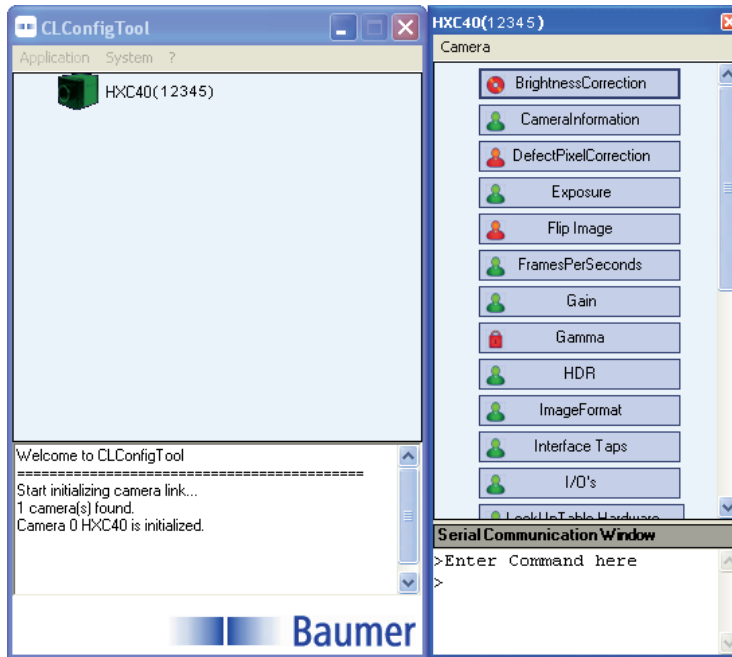
Information Window



The only item here is "Info", which causes the display of the Baumer-GAPI version.

2.4 Open Camera Window

Make a double click on the camera. The camera turns green and the camera window with the features opens.



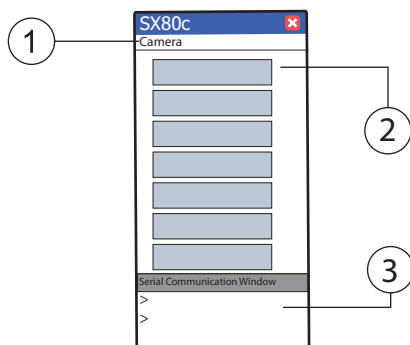
◀ **Figure 5**
Main window with Camera Window

2.5 Camera Window

The camera window (Fig. 4) is divided in three areas:

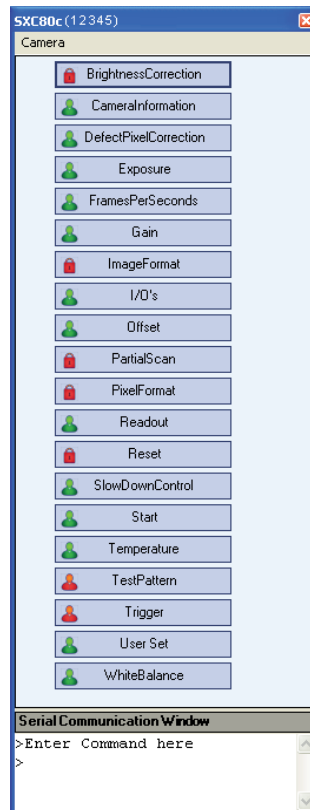
- Menu Bar (1),
- Feature Control (2),
- Serial Communication Window (3)

which are described in the following paragraphs.



◀ **Figure 6**
Framing of the camera window.

Figure 7 ►
Screenshot of Camera
Window



2.5.1 Menu Bar

The menu bar contains one menu:

- Camera.

2.5.1.1 Menu "Camera"

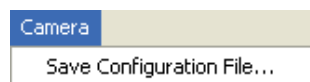


Figure 8 ►
Menu "Camera"

Here a copy of the configuration file (.xml) of the camera can be stored to the PC.







2.5.2 Features

By selecting a feature (button) in this area, an associated parameter list is opened.

Notice



Only features supported by the camera appears!

The availability and/or the status of a particular feature is indicated by several icons.

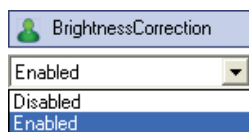
Icon	Status
	This feature is enabled.
	This feature is disabled.
	This feature is not supported by the software.
	This feature is not supported by the hardware.
	Depending on an other feature, this one is temporary locked.
	Feedback error on feature.

Some of the features are camera-specific.

Therefore the features are labeled within this document:

Label	Description
	This feature is available on monochrom cameras.
	This feature is available on color cameras.

2.5.2.1 BrightnessCorrection

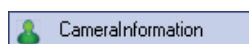


On Binning Mode, an aggregation of charge carriers takes place. This may cause an overload and therefore an overexposed image. For prevention of this effect, the Brightness Correction was introduces.

Notice

This feature is available in Binning Mode only.

2.5.2.2 Camera Information



Here several information on the employed camera, such as serial number, model name and firmware version, are provided.

2.5.2.3 DefectpixelCorrection



DefectPixelCorrection

☒ Enabled

Click Update button to get the current defectpixel list from camera.

Update defect pixel map

Defect pixel map

Index	X	Y	Enabled
0	1105	12	True
1	259	89	True
2	0	0	False
3	0	0	False
4	0	0	False
5	0	0	False
6	0	0	False
7	0	0	False
8	0	0	False
9	0	0	False

Set defect pixel

Index:

X:

Y:

Enabled:

Set

During the lifecycle of a camera, hot or cold pixels can develop. In order to correct these pixels, the so-called defect pixel map (or list) was introduced to Baumer cameras.

With this feature, Baumer offers the possibility to get the current defectpixel list from the connected camera and set defect pixel.

Notice

The coordinates reference to Full Frame Format.

With a connected SXC Camera you can not set defect pixel.

2.5.2.4 Device Clock



Device Clock

CAMERALINK

SENSOR

Frequency

80

40

Frequency

40

24

40

48

The speed (Mhz) to readout the sensor can be configured by using this feature. This reduces the data throughput at the frame grabber.

By reducing the clock, you can prevent buffer overflows, reduce power consumption and can use longer cables.

Notice

The offered speed are dependet from the connected camera.

2.5.2.5 Exposure



Exposure

32000 set

min:

max:

prev:

next:

Here the exposure time can be adjusted via entry or slider.

Notice

The values are given in μsec .

2.5.2.6 Flip Image



Flip Image

BGAPI_FLIPTYPE_NONE

BGAPI_FLIPTYPE_NONE

BGAPI_FLIPTYPE_X

BGAPI_FLIPTYPE_Y

BGAPI_FLIPTYPE_XY

With this feature you can mirror the image.

2.5.2.7 FramesPerSeconds



FramesPerSeconds

Discrete

Continuous

1

set

min

0

max

395

prev

0

next

0

Notice

Special value 0 = "Freerun"
Camera takes images at full frame rate without external trigger.

2.5.2.8 Gain



Gain

Analog Gain

1

set

min

1

max

20.09879

prev

1

next

2

Here the amplification factor can be adjusted via entry or slider.

2.5.2.9 Gamma



Gamma

1

set

min

0,5

max

2

Here the factor γ for the gamma correction can be set.

Notice

LookUpTable Hardware needs to be enabled to activate this feature.

2.5.2.10 HDR



	Value	Min	Max
Parameter for image 0			
PERCENT	0	0	255
Parameter for image 1			
PERCENT	0	0	255

HDR is a technique that allows a greater dynamic range of luminance between the lightest and darkest areas of an image.

Here you can set the HDR parameters.

2.5.2.11 ImageFormat

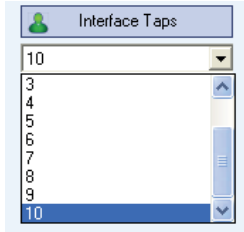


FormatId	0
Width	1624
Height	1236
OffsetX	0
OffsetY	0
ScaleFactorX	0
ScaleFactorY	0

Here the adjustment of the image format takes place.

Within the drop down menu all available image formats of the employed camera are displayed.

2.5.2.12 Interface Tabs



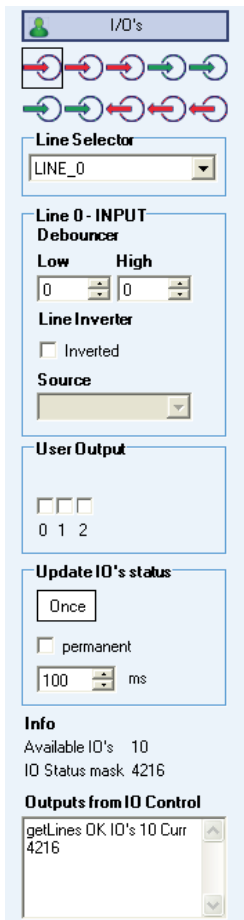
Here you can set the number of interface tabs. This is the number of parallel CameraLink channels for the transfer of the images from the camera to the computer.

Notice

Cameralink Base (one connector) 1,2,3 Taps
Cameralink Medium (two connectors) 3,4 Taps
Cameralink Full (two connectors) 8 Taps

Choose only 1,2,3,4 or 8 Taps!

2.5.2.13 I/O's



This feature offers the possibility of configuring the digital in- and outputs of the camera.

For an input, the Debouncer t_{Low} and t_{High} can be adjusted in μsec .

For an User output, the respective signal source can be selected.

You can choose how the update of the IO status should be made. You can select "permanently" or specify a time in μsec .

2.5.2.14 LookUpTable Hardware



LookUpTable Hardware

Look Up Table

LUMINANCE

☒ Enabled

Index	Value
0	0
1	1
2	2

Update

Set LUT Value

Index 0

Value 0

Set

By this feature, the internal Look-Up-Table can be loaded and enabled.

Furthermore, individual values can be set. Therefore the specific value needs to be defined and set within the area "Set LUT Value" at the bottom of the feature display. Afterwards the LUT needs to be updated via "Update" button.

Notice

The feature "Gamma" overwrites the LUT settings.

2.5.2.15 Offset



Offset

0

set

min 0

max 255

Here the analog offset (blacklevel) can be adjusted.

Notice

The value is depending on the connected camera.

2.5.2.16 PartialScan (ROI)



PartialScan

☒ Enabled

Left 0 1620

Top 0 1235

Right 1624 1624

Bottom 1236 1236

This feature offers the possibility of defining a so-called Region of interest (ROI).

Once the feature is enabled, the coordinates of the start respectively end point of the ROI can be adjusted by the sliders.

Notice

You must stop the camera before you can activating PartialScan.

2.5.2.17 PixelFormat



PixelFormat	
Mono8	
Color	False
ImageByteSize	2007264
PixelBits	8
PixelBytes	1
PixelFormat	17301505
in hex	0x1080001
DataLength	2007536
DataLengthMax	4014800
DataLengthMin	4

By this feature the pixelformat (depending on the current set image format) can be selected.

Below the drop down menu, several information on the pixel format are displayed.

Notice

The pixel format depends on the employed image format.

2.5.2.18 ReadoutMode



ReadoutMode	
OVERLAPPED	
SEQUENTIAL	
OVERLAPPED	

This feature refers to the timings of image acquisition. Here the operation mode can be switched between overlapped and sequential read out.

2.5.2.19 Reset



Reset	
Do It	

By processing this feature, the camera will be reset to factory settings.

Notice

Please stop the camera before reset.

2.5.2.20 Sensor Digitization Taps



Sensor Digitization Taps	
SIXTEEN	
DUAL	
QUAD	
EIGHT	
SIXTEEN	

This feature depends on the sensor of the employed camera.

The CMOSIS sensors, employed in Baumer HXC cameras can be read at up to 16 channels.

The CMOSIS sensors, employed in Baumer SXC cameras can be read at up to 4 channels.

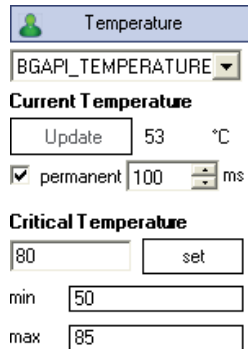
2.5.2.21 Start



Start	
Start	
Stop	
Start	

Here the camera (image acquisition) can be started or stopped.

2.5.2.22 Temperature

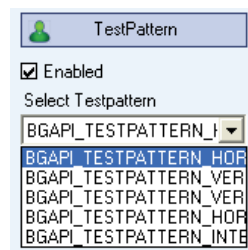


The interface for the Temperature feature includes a title bar with a person icon and the text 'Temperature'. Below it is a dropdown menu showing 'BGAPI_TEMPERATURE'. The 'Current Temperature' section has an 'Update' button, a display showing '53 °C', and a 'permanent' checkbox with a '100 ms' interval. The 'Critical Temperature' section has a 'set' button, a 'min' field with '50', and a 'max' field with '85'.

For cameras with integrated temperature sensor the current temperature at the camera board can be measured and displayed by this feature.

This can occur manually via the "Update" button or in a pre-defined "permanent" interval.

2.5.3 TestPattern

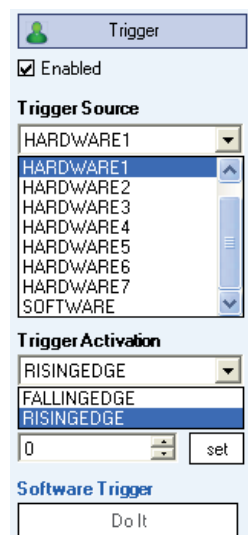


The TestPattern interface has a title bar with a person icon and 'TestPattern'. It includes an 'Enabled' checkbox and a 'Select Testpattern' dropdown menu. A list of test patterns is shown: 'BGAPI_TESTPATTERN_HOR', 'BGAPI_TESTPATTERN_VER', 'BGAPI_TESTPATTERN_VER', 'BGAPI_TESTPATTERN_HOR', and 'BGAPI_TESTPATTERN_INTB'.

Here several test patterns, generated in the camera, can be selected and displayed within the image view.

These patterns serve as a test tool for correct data transmission between camera and PC.

2.5.3.1 Trigger



The Trigger interface has a title bar with a person icon and 'Trigger'. It includes an 'Enabled' checkbox. The 'Trigger Source' section has a dropdown menu and a list of sources: 'HARDWARE1', 'HARDWARE2', 'HARDWARE3', 'HARDWARE4', 'HARDWARE5', 'HARDWARE6', 'HARDWARE7', and 'SOFTWARE'. The 'Trigger Activation' section has a dropdown menu and a list of activation types: 'RISINGEDGE', 'FALLINGEDGE', and 'RISINGEDGE'. There is a '0' field with a 'set' button. The 'Software Trigger' section has a 'Do It' button.

This feature offers the possibility to switch the camera to the trigger mode.

Once "Trigger" is enabled, the trigger source as well as the state of the trigger signal on which the camera should react is adjustable.

The button "Do it" provides the possibility of sending a software trigger to the camera.

Notice

"TriggerActivation" is only selectable on trigger source HARDWARE1-7.

2.5.3.2 User Set



Here several possibilities regarding to user sets are offered:

- Loading a user set
- Loading of BGAPI_USERSET_FACTORY will reset the camera
- Storing of the current camera configuration to a selected user set
- Selection of a default user set and therefore specification of a specific start behaviour of the camera

Notice

Factory settings can not be overwritten.

Please stop the camera before using this feature.

2.5.3.3 WhiteBalance



Once this feature is enabled, it provides two possibilities of color correction:

- One Push White Balance (via White Balance ROI)
Here the white balance is processed by employment of white balance factors, which are determined for a particular area (ROI) of the image. This ROI is adjustable via direct entry to the fields "Left", "Top", "Right" and "Bottom" or by usage of the sliders.
- User-specific Color Adjustment (via White Balance Factors)
Here the correction factor for each color can be adjusted user-specific.

Notice

At SXC cameras, you can not change White Balance ROI! It is only displayed.

2.6 Serial Communication Window

With the "Serial Communication Window", you can write commands directly in the register of the camera.

Notice

This configuration method should only be used by experienced customers!

Example: Set the exposure time to 4000 μ s ($4000_{\text{DEC}} = \text{fa0}_{\text{HEX}}$) using register address $0\text{x}f0004010$.

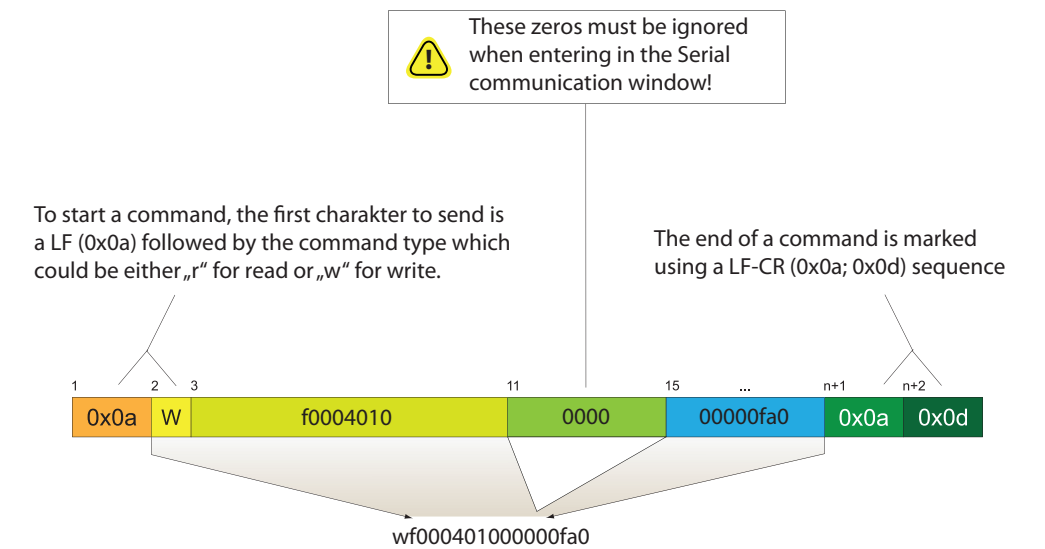
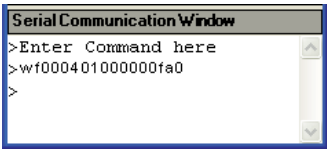


Figure 9 ▶
Structure of inputs

Your input in the Serial Communication Window must be: wf000401000000fa0

Figure 10 ▶
Serial Communication Window

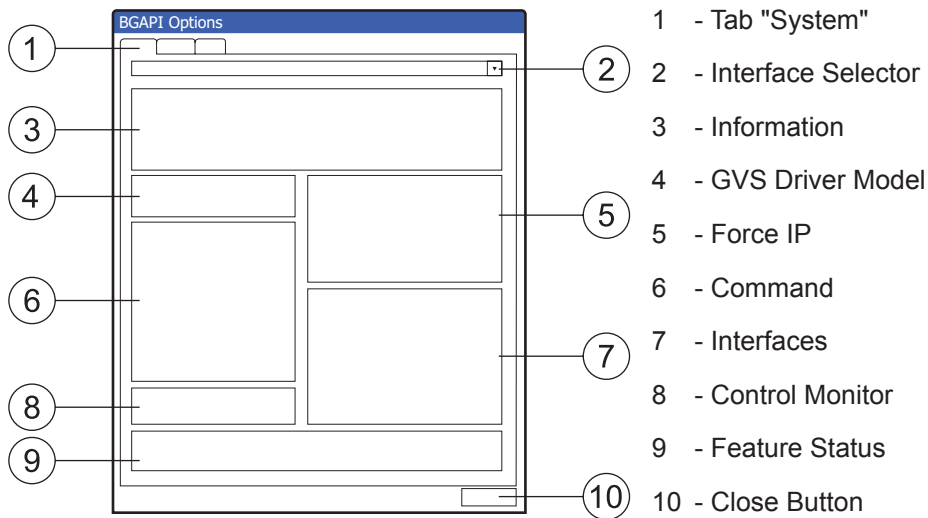


Notice

For a summary of the commands, see the register description of the camera.

2.7 BGAPI Options

2.7.1 System



◀ **Figure 11**
Option Window

2.7.1.1 Interface Selector

Currently there is only one option here:

BGAPICameraLink(BGAPIX_DEVICETYPE_COMMONPCI_CAMERALINK)

CL Config Tool only supports CameraLink.

2.7.1.2 Information

In this area several information on the selected interface are displayed.

2.7.1.3 GVS Driver Model

Not available with CameraLink.

2.7.1.4 Force IP

Not available with CameraLink.

2.7.1.5 Command

Not available with CameraLink.

2.7.1.6 Interfaces

Not available with CameraLink.

2.7.1.7 Feature Status

Here several information, whether a feature is supported or not, are stated.

2.7.2 Cameras

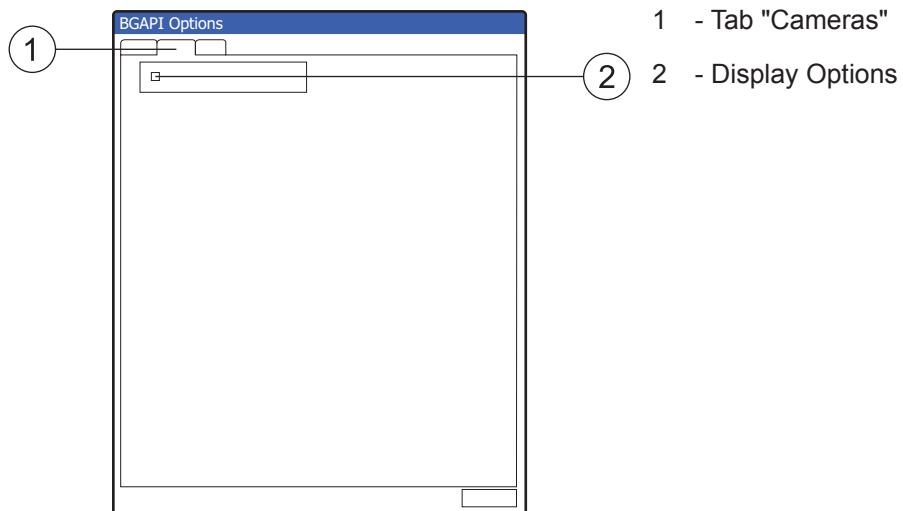


Figure 12 ►

Tab Cameras

By this feature the start behaviour of the camera is controlled.

- Enabling the checkbox "Start image acquisition direct after init" means the camera is started immediately after the camera window is opened.
- Disabling this checkbox means the image acquisition needs to be started manually.

2.7.3 Trace

Notice

The log file (trace), is written in the directory where the program is located. When you start the program from CD and you want to write a log file, you must change the path to write the log file.

Set the path under: System → Options → Trace

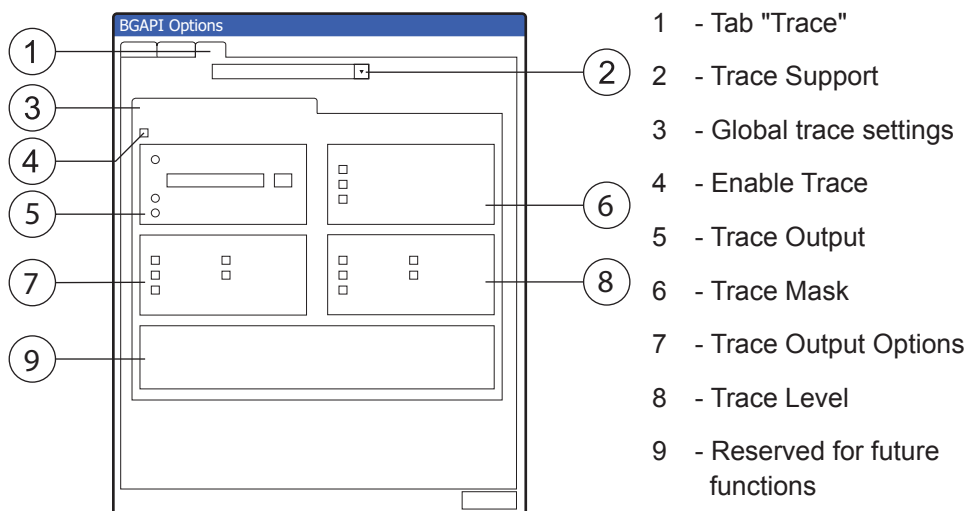


Figure 13 ►

Tab Trace

2.7.3.1 Tab "Trace"

On this tab you can set the trace output.

2.7.3.2 Trace Support

Currently there is only one option here - BGAPI_TRACESUPPORT_GLOBAL, which will trace events.

2.7.3.3 Enable Trace

Once this checkbox is activated tracing is enabled for the selected items within the boxes

of this dialog.

2.7.3.4 Trace Output

Here the output of the trace object can be controlled.

Therefore the following options are available:

File	The content of the trace object will be stored in a file on the PC.
Callback	The content of the trace object will be displayed in a message window.
Debugger	The content of the trace object will be directed to an external debugger.

2.7.3.5 Trace Mask

By this checkboxes the content of the trace object is adjustable.

2.7.3.6 Trace Output Options

Here several information can be added to the traced events:

Timestamp	The timestamp of the event is logged and displayed.
Timestamp Diff	The interval from the last traced event to the current one is displayed.
Prefix	not used.
New line	Linebreak is added to every output line.
Level	Here the levelfiltering (see 3.5.3.8.) can be enabled.

2.7.3.7 Trace Level

By this checkboxes, the levelfiltering can be adjusted.



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